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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/624,357	07/21/2003	Aaron Scott Lukas	06381P USA	7231

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EXAMINER	
RODGERS, COLLEEN E	
ART UNIT	PAPER NUMBER
2813	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/20/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/624,357	LUKAS ET AL.	
	Examiner	Art Unit	
	Colleen E. Rodgers	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 February 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *30,31 and 38-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *30,31 and 38-47* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action responds to the Amendment filed 21 February 2007. By this amendment, claims 30, 31, 38 and 43 are amended. Per the Interview on 6 February 2007, the Examiner withdraws the finality of the Office Action dated 27 November 2006.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 30, 31, 39 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Wu et al** (USPN 6,495,479) in view of the article by **Waldfried et al**, "Single Wafer RapidCuring™ of Porous Low-k Materials," *IEEE*, 2002, pp. 226-228.

Regarding claim 30, **Wu et al** disclose a mixture for depositing an organosilicate film comprising a dielectric constant of 3.5 or below [see col. 2, lines 59-64], the mixture comprising at least one structure-former precursor of an organosilane [see col. 7, lines 62-67] and a pore-former precursor that is distinct from the at least one structure-former precursor, wherein the pore-former precursor is a decomposable polymer [see col. 11, lines 8-13]. **Wu et al** do not disclose wherein said film exhibits an absorbance of 200 to 400 nm wavelength. **Wu et al** would look to one such as **Waldfried et al** for a porous low-k film, because **Waldfried et al** disclose wherein a film formed thus would exhibit an absorbance in the 200 to 400 nm wavelength range. It would have been obvious to one of ordinary skill in the art at the time of invention to modify **Wu et al** using the

mixture of **Waldfried et al** because **Waldfried et al** disclose improved low-k material properties, and reduced process times and process temperatures [see **Waldfried et al**, Abstract].

Regarding claim 31, **Wu et al** disclose a mixture for depositing an organosilicate film, the mixture comprising: from 5 to 95% by weight of a structure-former precursor of an organosilane [see col. 7, lines 62-67; see also col. 12, lines 47-53] and from 5 to 95% by weight of a pore-former precursor that is distinct from the at least one structure-former precursor, wherein the pore-former precursor is a decomposable polymer [see col. 11, lines 8-13; see also col. 12, lines 47-53]. **Wu et al** do not disclose wherein said film exhibits an absorbance of 200 to 400 nm wavelength. **Wu et al** would look to one such as **Waldfried et al** for a porous low-k film, because **Waldfried et al** disclose wherein a film formed thus would exhibit an absorbance in the 200 to 400 nm wavelength range. It would have been obvious to one of ordinary skill in the art at the time of invention to modify **Wu et al** using the mixture of **Waldfried et al** because **Waldfried et al** disclose improved low-k material properties, and reduced process times and process temperatures [see **Waldfried et al**, Abstract].

Regarding claims 39 and 44, **Wu et al** and **Waldfried et al** disclose the mixtures of claims 30 and 31, respectively. Furthermore, **Wu et al** disclose wherein the decomposable polymer is decomposable by radiation [see col. 11, lines 4-7].

4. Claims 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Ko et al** (US Patent Application Publication 2001/0055891) in view of the article by **Waldfried et al**, "Single Wafer RapidCuring™ of Porous Low-k Materials," *IEEE*, 2002, pp. 226-228.

Regarding claim 30, **Ko et al** disclose a mixture for depositing an organosilicate film comprising a dielectric constant of 3.5 or below [see paragraph 0010], the mixture comprising at

least one structure-former precursor of an organosilane [see paragraphs 0027-0029] and a pore-former precursor that is distinct from the at least one structure-former precursor, wherein the pore-former precursor is a decomposable polymer or a hydrocarbon [see paragraphs 0030 and 0036]. **Ko et al** do not disclose wherein said film exhibits an absorbance of 200 to 400 nm wavelength. **Ko et al** would look to one such as **Waldfried et al** for a porous low-k film, because **Waldfried et al** disclose wherein a film formed thus would exhibit an absorbance in the 200 to 400 nm wavelength range. It would have been obvious to one of ordinary skill in the art at the time of invention to modify **Ko et al** using the mixture of **Waldfried et al** because **Waldfried et al** disclose improved low-k material properties, and reduced process times and process temperatures [see **Waldfried et al**, Abstract].

Regarding claim 31, **Ko et al** disclose a mixture for depositing an organosilicate film, the mixture comprising: from 5 to 95% by weight of a structure-former precursor of an organosilane [see paragraphs 0027-0029; see also paragraph 0044] and from 5 to 95% by weight of a pore-former precursor that is distinct from the at least one structure-former precursor, wherein the pore-former precursor is a decomposable polymer or a hydrocarbon [see paragraphs 0030 and 0036; see also paragraph 0044]. **Ko et al** do not disclose wherein said film exhibits an absorbance of 200 to 400 nm wavelength. **Ko et al** would look to one such as **Waldfried et al** for a porous low-k film, because **Waldfried et al** disclose wherein a film formed thus would exhibit an absorbance in the 200 to 400 nm wavelength range. It would have been obvious to one of ordinary skill in the art at the time of invention to modify **Ko et al** using the mixture of **Waldfried et al** because **Waldfried et al** disclose improved low-k material properties, and reduced process times and process temperatures [see **Waldfried et al**, Abstract].

5. Claims 40-42 and 45-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Wu et al** (USPN 6,495,479) in view of the article by **Waldfried et al**, "Single Wafer RapidCuring™ of Porous Low-k Materials," *IEEE*, 2002, pp. 226-228 as applied to claims 30, 31, 39 and 44 above, and further in view of **Lin et al** (USPN 7,041,748). The prior art of **Wu et al** and **Waldfried et al** disclose the mixture of claims 39 and 44 above. Neither **Wu et al** nor **Waldfried et al** disclose wherein the decomposable polymer is a block copolymer, a hyper-branched polymer or a dendrimeric polymer. **Lin et al** disclose a mixture for depositing an organosilicate film with a dielectric constant lower than 3, which is formed by the inclusion of a pore-former precursor, or poragen, wherein the poragen may be a decomposable polymer, specifically a block copolymer (claims 40 and 45) [see col. 20, lines 3-6], and more specifically copolymers or star-shaped polymers (claims 41 and 46), or dendrimeric polymers (claims 42 and 47) [see col. 3, lines 58-63].

6. Claims 38 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Ko et al** (US Patent Application Publication 2001/0055891) in view of the article by **Waldfried et al**, "Single Wafer RapidCuring™ of Porous Low-k Materials," *IEEE*, 2002, pp. 226-228 as applied to claims 30 and 31 above, and further in view of **Li et al** (US Patent Application Publication 2003/0151031). The prior art of **Wu et al** and **Waldfried et al** disclose the mixture of claims 30 and 31 above. Neither **Wu et al** nor **Waldfried et al** disclose wherein the hydrocarbon is selected from the group consisting of alpha-terpinene, limonene, cyclohexane, gamma-terpinene, dimethylhexadiene, ethylbenzene, norbornadiene, cyclopentene oxide, 1,2,4-trimethylcyclohexane, 1,5-dimethyl-1,5-cyclooctadiene, camphene, adamantane, 1,3-butadiene, substituted dienes, alpha-pinene, beta-pinene or decahydronaphthelene. **Li et al** disclose a mixture for depositing an organosilicate film with a dielectric constant lower than 3 [see paragraph 0005], which is formed by the inclusion of a pore-

former precursor, or poragen, wherein the poragen may be a hydrocarbon, including adamantane [see paragraph 0136]. It would have been obvious to one of ordinary skill in the art at the time of invention to use the poragen disclosed by **Li et al** in the mixture of **Ko et al** because **Li et al** disclose that adamantane is one of several art-recognized useful poragen materials.

Response to Arguments

7. Applicant's arguments, see Remarks, filed 8 September 2006 and clarified during the Interview of 6 February 2007, and further reiterated in the Remarks dated 21 February 2007, with respect to the rejection(s) of claim(s) 30, 31 and 38-47 under the **Mandal** reference have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of the above-cited art.

Conclusion

8. Applicant's amendment (filed 10 May 2007) necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Colleen E. Rodgers whose telephone number is (571) 272-8603. The examiner can normally be reached on Monday through Friday, 9:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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